

REMARKS

Claims 1-3 and 6 are presently pending in the application.

Claims 1 and 4 have been amended to remove a portion of the subject matter of old claim 4 and include the subject matter in claim 1. Claim 5 was previously canceled in response to Paper No. 20031203. Therefore, no new matter has been added.

CLAIM REJECTIONS

In Paper No. 20040308, the Examiner has rejected claims 1-3 and 6 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,190,793 of Barton et al. (“Barton”) in view of U.S. Patent No. 5,472,801 of Mattejat et al. (“Mattejat”). Also, claim 4 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Barton in view of Mattejat and U.S. Patent No. 4,198,597 of Sawyer (“Sawyer”). Applicants respectfully traverse these rejections and the arguments in support thereof as follows, and respectfully request reconsideration and withdrawal of the rejections.

Rejection of Claims 1 -3, and 6 Under 103(a) Based on Barton and Mattejat

The Examiner alleges that claims 1-3, and 6 are unpatentable over Barton in view of Mattejat. The Examiner argues that Barton’s teachings clearly envision that one of the advantages to his fuel cell stack with an improved compression assembly is to be able to replace membrane electrode assemblies (MEAs) which become poisoned. The Examiner admits that Barton, while allegedly disclosing the aspect of MEA replacement, does not expressly disclose the specific hollow plate structure. The Examiner further asserts that Mattejat’s fuel stack arrangement includes two plates with protuberances that somehow impart an undulate cross-section in the hollow space separating one plate from another. The Examiner contends that the disclosed fuel cell is substantially equivalent to the structural configuration of the present claims (i.e., two plates forming a hollow section and able to form a gap therebetween). The Examiner concludes that it would have been obvious to one skilled in the art at the time the invention was made to incorporate the specific hollow plate structure of Mattejat in the fuel cell assembly of Barton. Applicants respectfully disagree.

Barton does not suggest that the fuel cell stack disclosed has the advantage of replacing deteriorated MEAs or unit cells, which comprise MEAs and adjacent conductive separator plates. The Examiner in support of his contention cites Barton, at col. 3, lines 15 – 20. He argues that for an electrocatalyst which is severely poisoned, it may be necessary to dismantle the fuel cell stack and replace the MEAs and the components which caused the contamination. Barton identified a disadvantage of previous fuel cell stacks where metallic tension members within the stack are a source of metal ions that can contaminate the membrane electrolyte and/or electrocatalyst in the MEAs (col. 3, lines 10 – 28).

However, Barton’s solution to this problem is not a fuel cell stack that allows the replacement of contaminated MEAs, but rather the use of a non-metallic tension member, such as one made of pultruded fiberglass, that is no longer a source of contamination (col. 4, lines 53 – 67). The elongate tension member **60** used by Barton, extends between and through end plate assemblies **20** and **30** to retain and secure stack **10** in its assembled state (col. 7, lines 64 – 67, and col. 8, lines 1 – 7, Figure 1). The tension member extends through the MEAs.

Therefore unlike Applicants’ fuel cell, Barton’s design does not allow detachable MEAs or unit cells. In order to remove MEAs or unit cells, Barton’s fuel cell stack must be dismantled by removing an end plate assembly in order to slide the layers off of the tension member to access a deteriorated MEA or unit cell. Applicants’ fuel cell allows the removal and installation of a single MEA or unit cell without dismantling the entire stack. Therefore, Barton does not teach or suggest a fuel cell stack with detachable MEAs or unit cells.

Mattejat does not enable or suggest the incorporation of two plates with undulate cross-sections to create a fuel cell stack with detachable MEAs or unit cells. Applicants claim the use of retainer plates with undulate cross-sections that allow defective unit cells to be readily removed and replaced from a fuel cell stack. (claims 1 and 6 – see also page 7 in the specification of the present application) Unlike Applicant, the component disclosed by Mattejat does not suggest or teach that detachable unit cells are possible.

Mattejat addresses the disadvantage of prior components unable to supply hydrogen, oxygen, and a coolant to the fuel cell through the same component. (col. 1, lines 51 – 54, col. 2, lines 30 – 34). The component **38** of Mattejat includes two plates **40**, **42** joined to one another by means of a gas-tight weld seam **44** (col. 5, lines 35-39, Figure 3). In addition, if the component is intended for use in a fuel cell stack, Mattejat requires the use of a seal in order to create gas-

tight chambers outside the component (col. 2, lines 55 – 67, and col. 3, lines 1 – 8). The seal is made of an elastomer and created by stacking the elastomeric material in between the components and the MEAs (col. 5, lines 64 – 67, col. 6, lines 1 – 11). Because of the requirement to form gas-tight chambers in Mattejat's fuel cell, Mattejat does not suggest that the MEAs incorporated into the gas-tight seals are readily detachable.

In addition, the structure of the fuel cell disclosed by Mattejat is not substantially equivalent to the structural configuration of the present claims. Applicants, unlike Mattejat, include conductive separator plates with gas supply channels which sandwich the unit cells (first and second paragraph on page 7 of the present application). Applicants' conductive separator plates provide the MEAs with hydrogen or oxygen, unlike Mattejat's component which supplies all gases. Neither Barton nor Mattejat teach or suggest a fuel cell stack with detachable MEAs or unit cells, nor is the structure of the fuel cell stack disclosed by Mattejat substantially similar to Applicants' claimed fuel cell. Therefore, it would not have been obvious at the time the invention was made to incorporate Mattejat's component in Barton's fuel cell and arrive at the fuel cell stack with detachable MEAs and unit cells claimed by Applicants.

Rejection of Claim 4 Under 103(a) Based on Barton, Mattejat, and Sawyer

The Examiner alleges that claim 4 (a portion of the subject matter now a part of claim 1) is unpatentable over Barton in view of Mattejat and Sawyer. The Examiner relies on the contentions previously mentioned that claim 1 is unpatentable over Barton in view of Mattejat. The Examiner admits that Barton and Mattejat do not expressly disclose the use of a voltage measurement jig and voltage display device. The Examiner argues that Sawyer discloses a detector for sensing one or more negative cells in a multi-celled module and more particularly, to a detector apparatus for continuously monitoring each voltage producing cell of a module in fuel cells to identify faulty or inoperative cells. The Examiner concludes that it would have been obvious to one skilled in the art at the time the invention was made to incorporate the voltage measurement jig and the voltage display device of Sawyer into the fuel cell system of both Barton and Mattejat as Sawyer discloses that such devices for detecting and displaying voltage are used for sensing defective cells among a plurality of voltage producing cells which together form a source of electrical power such as the fuel cell. Applicants respectfully disagree.

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Barton and Mattejat do not disclose the concept of making detachable MEAs or unit cells. As explained above, Barton discloses a fuel cell stack that must be dismantled in order to replace a deteriorated MEA or unit cell. Mattejat does not teach or suggest that the disclosed component when placed in a fuel cell stack enables detachable MEAs or unit cells. The Examiner has failed to support his rejection of the elements of claim 1 which now includes a portion of the subject matter of old claim 4. In addition, the Examiner has failed to support his rejection of current claim 4 which depends from claim 1. Therefore, it would not have been obvious to one skilled in the art at the time the invention was made to incorporate the voltage measurement jig in order to arrive at the fuel cell stack with detachable MEAs or unit cells claimed by Applicants.

As previously explained, no combination of Barton, Mattejat, or Sawyer teaches, or suggests the incorporation of two plates with undulate cross-sections in a fuel cell stack, so that MEAs, or unit cells are detachable. Accordingly, no *prima facie* case of obviousness has been established based on the proposed combinations. Reconsideration and withdrawal of the § 103(a) rejections are respectfully requested.

In view of the above Remarks, it is submitted that all of the claims in the application are patentably distinguishable over the prior art of record. Accordingly, reconsideration and withdrawal of the rejections and an early Notice of Allowance are respectfully requested.

Respectfully submitted,

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